

WE CLAIM:

1. A high voltage reset circuit for increasing a dynamic range of a CMOS image sensor, the high voltage reset circuit comprising:

a high voltage supply circuit for supplying a high supply voltage, the high supply voltage having a higher voltage level than a maximum supply voltage of an associated CMOS fabrication process used for the CMOS image sensor; and

a high voltage level shifter circuit arranged to receive the high supply voltage and configured to output a high reset signal, the high voltage level shifter circuit being coupled to a gate of a reset transistor in a pixel circuit of a pixel array, the gate receives the high reset signal and maintains a gate to source potential less than the maximum supply voltage while a potential on a cathode of a photodiode, coupled to the reset transistor, charges up to a supply voltage of the associated CMOS fabrication process.

2. The high voltage reset circuit of claim 1, wherein the high voltage level shifter circuit comprises a plurality of dual gate oxide transistors on a dual gate oxide CMOS chip.

3. The high voltage reset circuit of claim 2, wherein the plurality of dual gate oxide transistors include two p-channel transistors, an input pair of n-channel transistors, and a p-channel transistor and an n-channel transistor configured as an inverter.

4. The high voltage reset circuit of claim 2, wherein the high supply voltage comprises a dual gate supply voltage associated with the plurality of dual gate oxide transistors.

5. The high voltage reset circuit of claim 1, wherein the high voltage level shifter circuit comprises a plurality of supertransistors.

6. The high voltage reset circuit of claim 5, wherein each of the plurality of supertransistors includes an input shielding transistor, a switching transistor, and an output shielding transistor.

7. The high voltage reset circuit of claim 1, wherein the high voltage supply circuit comprises a high voltage charge pump.

8. The high voltage reset circuit of claim 1, wherein the high reset signal comprises at least two voltage states, a first state having a first voltage level less than the maximum supply voltage and a final state having a final voltage level greater than the maximum supply voltage.

9. The high voltage reset circuit of claim 8, wherein the final voltage level is substantially equal to the sum of the maximum supply voltage and at least one threshold voltage of the reset transistor in the pixel circuit.

10. The high voltage reset circuit of claim 1, wherein the high reset signal comprises a gradually increasing voltage signal.

11. A high voltage reset method for increasing a dynamic range of a CMOS image sensor, the method comprising:

applying a first voltage to a gate of a reset transistor of a pixel; and
applying at least one subsequent voltage to the gate, each subsequent voltage having an increased voltage level, a final voltage out of the subsequent voltages having a voltage level greater than a maximum supply voltage associated with a CMOS fabrication process used in the CMOS image sensor, the first and subsequent voltages being applied in a manner to prevent gate oxide breakdown on the gate when the increased voltage level is above a maximum supply voltage associated with the CMOS fabrication process.

12. The high voltage reset method of claim 11, wherein the at least one subsequent voltage is one subsequent voltage that corresponds to the final voltage.

13. The high voltage reset method of claim 11, wherein the at least one subsequent voltage represents a gradually increasing voltage signal.

14. The high voltage reset method of claim 13, wherein the gradually increasing voltage signal has a slow low to high transition such that a potential on a photodiode in the pixel and a source of the reset transistor follow the first and subsequent voltages.

15. A circuit for increasing a dynamic range of an image sensor, comprising:
a means for generating a high supply voltage, the high supply voltage having a higher voltage level than a maximum supply voltage of an associated fabrication process used for the image sensor;

a means for receiving a reset signal; and

a means for generating a high reset signal based on the reset signal and the high supply voltage, the high reset signal being coupled to a gate of a reset transistor in a pixel circuit of a pixel array, the high reset signal allowing the reset transistor to maintain a gate to source potential less than the maximum supply voltage while a potential on a cathode of a photodiode, coupled to the reset transistor, charges up to a supply voltage associated with the associated fabrication process.

16. The circuit of claim 15, wherein the means for generating a high reset signal includes a high voltage level shifter circuit.

17. The circuit of claim 16, wherein the high voltage level shifter circuit includes a plurality of supertransistors.

18. The circuit of claim 16, wherein the high voltage level shifter circuit includes a plurality of dual gate oxide transistors on a dual gate oxide chip.

19. The circuit of claim 15, wherein the means for generating a high supply voltage includes a dual gate supply voltage associated with a plurality of dual gate oxide transistors.

20. The circuit of claim 15, wherein the high reset signal comprises at least two voltage states, a first state having a first voltage level less than the maximum supply voltage and a final state having a final voltage level greater than the maximum supply voltage.

21. The circuit of claim 15, wherein the high reset signal comprises a gradually increasing voltage signal.